USDA Forest Service Resource Bulletin PNW-47

AREAS OF NONFOREST AND NONCOMMERCIAL FOREST LANDS by COVER TYPE and by TOPOGRAPHIC SITE for INTERIOR ALASKA

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ABSTRACT

Previously unreported land-cover data obtained during a 1957-62 forest inventory of 229 million acres of interior Alaska are given. Tables have been prepared for 10 subunit divisions showing area of noncommercial land by topographic site and nonforest land by eight different ecosystems. A brief description is given of methodology and terminology.

Keywords: Land classification, forest surveys, interior Alaska.

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INTRODUCTION

During 1957 to 1962, an initial reconnaissance inventory was made of interior Alaska forests. This inventory employed a three-stage sampling design of photo interpretation on 1:5,000-scale strip photography, air checks, and ground samples that were generally restricted to commercial forest locations.[1] The inventory provided the first comprehensive data for 229 million acres of Alaska's interior considered to have commercial forest potential. Results of the inventory are reported in Resource Bulletin PNW-19.[2]

Since the release of the resource bulletin, increasing interest in total land planning has shown the need for more land classification information than was originally reported. This is particularly true for the nonforest and noncommercial forest lands. Our original photo interpretation identified various subclasses within these broad groupings, but in the published report only major land classes were shown. This paper complements Resource Bulletin PNW-19 in reporting data for subclasses as well as the major land classes.

TERMINOLOGY

The basic Forest Survey land classes,[3] the subclasses used in photo interpretation (many of the land and forest cover types listed are illustrated[4] [5]), and other terms used in the tables are as follows.

Land area.--The area of dry land and land temporarily or partially covered by water such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide); streams, sloughs, estuaries, and canals less than one-eighth of a statute mile in width; and lakes, reservoirs, and ponds less than 40 acres in area.

Water area.--Separated into two classes as defined below. The boundary between land and water was taken to be the high waterline or, in the case of salt water, the mean high tide line.

Census water: water bodies more than 40 acres in size and streams more than 1/8 mile wide (to high waterline).

Noncensus water: water bodies more than 1 but less than 40 acres in size and streams more than 120 feet but less than 1/8 mile wide.

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[1] R. C. Wilson. Working plan for the forest survey of interior Alaska. USDA For. Serv. Div. For. Econ. Res., Washington, D.C., 1957. (Unpub. rep.)

[2] O. Keith Hutchison. Alaska's forest resource. USDA For. Serv. Resour. Bull. PNW-19, 74 p., illus., 1967. Pac. Northwest For. & Range Exp. Stn., Portland, Oreg.

[3] USDA Forest Service. FSH 4800 Forest Service Handbook, 1960.

[4] H. J. Lutz and A. P. Caporaso. Indicators of forest land classes in air-photo interpretation of the Alaskan interior. Alaska For. Res. Cent. Stn. Pap. 10, 31 p., illus., 1958.

[5] Karl M. Hegg. A photo identification guide for the land and forest types of interior Alaska. USDA For. Serv. Res. Pap. NOR-3, 55 p., illus., 1967. North. For. Exp. Stn.

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Forest cover type.-- A classification of forest land based upon predominant species by gross volume in the present tree cover (board feet for sawtimber, cubic feet for poletimber, or the predominant crown cover in seedling and sapling stands).

Offsite.-- Sites supporting commercial tree species but with trees of such poor form that there is little or no potential for a future forest product.

Stocking classes.--Based on crown closure of all trees. Stocking is the extent to which growing space is effectively utilized by present or potential growing stock trees.

Well-stocked:	70 percent or more stocked
Medium-stocked:	40-69 percent stocked
Poorly stocked:	10-39 percent stocked
Nonstocked:	less than 10 percent stocked but having evidence of previous forest cover.

Forest land.--Land at least 10 percent stocked by forest trees of any size, or formerly having such tree cover, and not currently developed for nonforest use.

Commercial forest land: Forest land which is producing or is capable of producing crops of industrial wood and is not withdrawn from timber utilization. Includes lands of site quality capable of producing more than 20 cubic feet per acre annually.

Noncommercial forest land: Unproductive forest land incapable of yielding crops of industrial wood because of adverse site conditions and productive forest land withdrawn from commercial timber use through statute or administrative regulation. Three subclasses were recognized within this cover class.

Noncommercial spruce - short, slow-growing, open-to-dense stands of spruce (generally black spruce) on cold, wet, poorly drained sites. Mostly on level or gently inclined sites, but also occurring on north-facing slopes north and west of the Alaska Range and within the Copper River Basin. Also found on somewhat better sites where restricted drainage and permafrost limit the tree growth to less than commercial.

Subalpine - open stand of stunted, deformed trees, generally white spruce intermixed with black spruce and occasionally balsam poplar; an alpine and/or mountain noncommercial type usually occurring above 2,500-foot elevation in central Alaska but at elevations as low as 500 feet in western Alaska and northerly latitudes. Quite often this type will have considerable per-acre cubic volume but little board-foot volume because of the rapid taper of the trees.

Other - open to dense stands of "offsite" aspen and balsam poplar. Occurs on dry, south-facing, steep slopes (45 to 50 percent and greater) and on overdrained river gravel bars. In the Copper River valley this class also includes spruce on rocky, steep slopes. Trees on these sites are unusually short (15 to 35 feet) with large crowns.

Topographic site.-- All forest types, in the noncommercial strata, were assigned one of the following combinations of topographic site classifications: Drained level, drained slope, wet level, wet slope, or subalpine for those sites considered to be chiefly influenced by high elevations.

Level sites: slopes less than 3 percent.

Slope sites: slopes 3 percent or more.

Wet sites: those in which subsurface drainage is restricted to the upper 18 inches of soil mantle. Evidences of wet sites observable on aerial photos are pure stands of noncommercial black spruce type, high stem density with variable heights, standing water, and the scarcity or absence of aspen and cottonwood trees. In the permafrost zone, surface indicators of poor drainage include frost polygons, beaded drainage patterns, thaw lakes, thermokarsts, and slumping. Although no single indicator may be reliable, a combination of two or more indicators is reasonably so.

Drained sites: those in which subsurface drainage is not restricted to the upper 18 inches of the soil mantle. Some indicators of drained sites are the absence of muskeg-type vegetation or standing water, a preponderance of hardwoods, and generally medium- to well-stocked forest stands. Although no single indicator may be reliable, a combination of two or more indicators of drained forest sites is reasonably reliable.

Nonforest land.--Land that does not qualify as forest land. Includes land that has never supported forests and lands formerly forested where forest use is precluded by development for nonforest uses, such as crops, improved pasture, residential areas, and city parks. Also includes improved roads and certain areas of water classified by the U.S. Bureau of the Census as land. Unimproved roads, streams, canals, and nonforest strips in forest areas must be more than 120 feet wide, and clearings in forest areas must be more than 1 acre in size, to qualify as nonforest land.

Urban-agricultural: villages, towns, farms, and rights-of-way.

Dry meadow: upland, grassy. May contain some shrubs. Type includes lichen- and moss-covered slopes. Boundary of type crosses contour line.

Wet meadow: grass, sedge, moss tussock type, and sphagnum swamps. May contain low shrubs and trees. Commonly bordered by stands of short black spruce. Generally, borders of this type follow the contour. Tundra areas with numerous potholes and with indications of frost polygons and soil slumping have been classed in this type.

Dwarf shrub: less than 4 feet in height. Species composition is chiefly bog birch and blueberry. Prostrate forms of willow and alder occur at higher and more exposed locations.

Tall shrub: includes willow and alder exceeding 4 feet in height. Usually with very high density. Occurs on both upland and lowland situations.

Barren: majority of the area has no vegetation. Generally, rocky or gravelly or recently built-up river bars. Stocking of trees is less than 10 percent.

Glaciers, ice, and snowfields: chiefly occupied by ice or snow and appearing of a permanent nature. This type includes considerable areas of "barren." Our original 10 units were delineated by heights of land between major drainages. Within these units, large areas were obviously incapable of supporting vegetative growth and were excluded in total from our photo sample. These exclusion areas are a mixture of barren and glacier and icefield, all classified in the glacier-icefield stratum.

TABLES

The tables have been developed from proportions obtained through photo interpretation. The proportions by cover type within each major land class were not corrected by ground samples, although the major land class acreages of commercial forest, noncommercial forest, and nonforest were adjusted as part of the original sampling procedure.

Data are provided for 10 units (see fig. 1) but should be used with some caution. The original inventory was designed to sample the 229-million-acre interior area as a single unit, and the subunit acreages cannot be given a sampling error. In addition, the sample of discrete items such as towns, highways, and lakes may be weak--particularly by subunit. Our sample was taken from strip photography at 30-mile intervals and easily could have missed sharply defined areas. As an example, Tustumena and Skilak Lakes in the Kenai unit were between flight strips and their combined areas were nearly three times greater than the census water area assigned that unit.

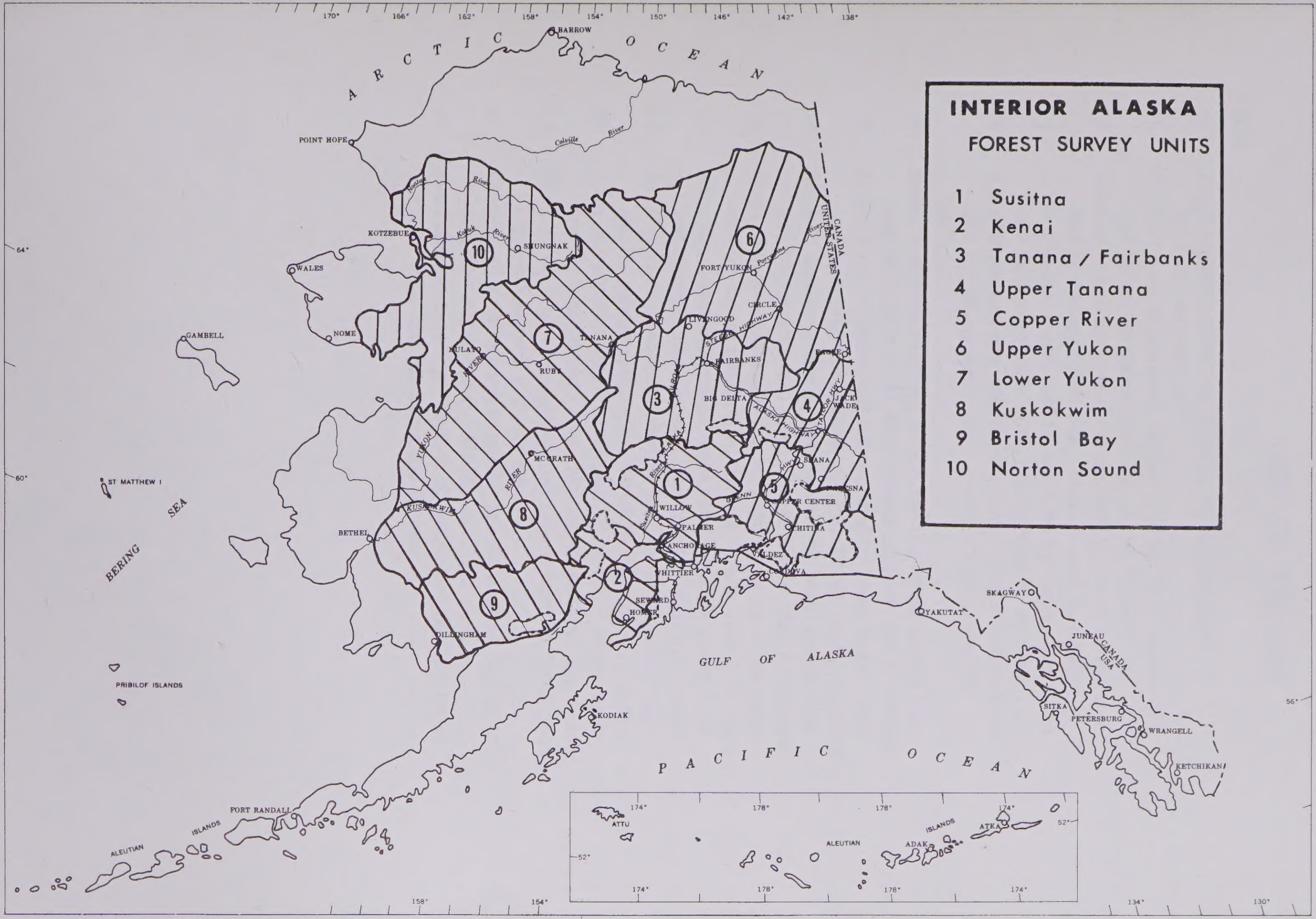

Figure 1.--*The exterior boundary of these Forest Survey units indicates the approximate limit of commercial tree growth in the interior. The diagonal lines indicate the approximate location of flight lines to obtain the aerial photography used for the interior forest inventory.*

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Table 1.--*Land areas in interior Alaska, by major class of land and survey unit*

(Thousand acres)[1]

Survey unit	Total land area	Forest land			Nonforest
		Total	Commercial	Noncommercial	
Susitna	16,490	4,292	2,023	2,269	12,198
Kenai	5,544	2,070	1,481	589	3,474
Tanana/Fairbanks	20,266	12,989	3,561	9,428	7,277
Upper Tanana	13,633	6,746	1,272	5,474	6,887
Copper River	16,424	4,431	1,060	3,371	11,993
Upper Yukon	36,928	22,557	4,945	17,612	14,371
Lower Yukon	44,975	30,005	4,232	25,773	14,970
Kuskokwim	26,564	14,662	2,594	12,068	11,902
Bristol Bay	12,877	2,741	704	2,037	10,136
Norton Sound	31,113	5,311	603	4,708	25,802
Total	224,814	105,804	22,475	83,329	119,010
Unsurveyed area	107,741	--	--	--	107,741
Total interior	332,555	105,804	22,475	83,329	226,751

[1] 1 acre equals 0.4047 hectare or 1 hectare equals 2.47 acres.

Table 2.--*Area of noncommercial forest land by local cover type and by topographic site, all units, Alaska*

(Thousand acres)[1]

Topographic site	Total	Cover type		
		Spruce	Subalpine	Other
Drained level	572	326	--	246
Drained slope	3,890	2,299	--	1,591
Wet level	11,321	11,181	--	140
Wet slope	59,227	58,983	--	244
Subalpine	8,319	--	8,319	--
Total	83,329	72,789	8,319	2,221

[1] 1 acre equals 0.4047 hectare or 1 hectare equals 2.47 acres.

Table 3.--*Area of noncommercial forest land by local cover type and by topographic site, Susitna unit 1, Alaska*

(Thousand acres)[1]

Topographic site	Total	Cover type		
		Spruce	Subalpine	Other
Drained level	17	11	--	6
Drained slope	238	142	--	96
Wet level	397	397	--	0
Wet slope	857	857	--	0
Subalpine	760	--	760	--
Total	2,269	1,407	760	102

[1] 1 acre equals 0.4047 hectare or 1 hectare equals 2.47 acres.

Table 4.--*Area of noncommercial forest land by local cover type and by topographic site, Kenai unit 2, Alaska*

(Thousand acres)[1]

Topographic site	Total	Cover type		
		Spruce	Subalpine	Other
Drained level	0	0	--	0
Drained slope	49	14	--	35
Wet level	222	222	--	0
Wet slope	235	235	--	0
Subalpine	83	--	83	--
Total	589	471	83	35

[1] 1 acre equals 0.4047 hectare or 1 hectare equals 2.47 acres.

Table 5.--*Area of noncommercial forest land by local cover type and by topographic site, Tanana/Fairbanks unit 3, Alaska*

(Thousand acres)[1]

Topographic site	Total	Cover type		
		Spruce	Subalpine	Other
Drained level	166	58	--	108
Drained slope	223	115	--	108
Wet level	1,871	1,864	--	7
Wet slope	6,297	6,283	--	14
Subalpine	871	--	871	--
Total	9,428	8,320	871	237

[1] 1 acre equals 0.4047 hectare or 1 hectare equals 2.47 acres.

Table 6.--*Area of noncommercial forest land by local cover type and by topographic site, Upper Tanana unit 4, Alaska*

(Thousand acres)[1]

Topographic site	Total	Cover type		
		Spruce	Subalpine	Other
Drained level	6	6	--	0
Drained slope	68	11	--	57
Wet level	625	597	--	28
Wet slope	3,127	3,121	--	6
Subalpine	1,648	--	1,648	--
Total	5,474	3,735	1,648	91

[1] 1 acre equals 0.4047 hectare or 1 hectare equals 2.47 acres.

Table 7.--*Area of noncommercial forest land by local cover type and by topographic site, Copper River unit 5, Alaska* (Thousand acres)[1]

Topographic site	Total	Cover type		
		Spruce	Subalpine	Other
Drained level	0	0	--	0
Drained slope	95	54	--	41
Wet level	1,098	1,092	--	6
Wet slope	1,537	1,531	--	6
Subalpine	641	--	641	--
Total	3,371	2,677	641	53

[1] 1 acre equals 0.4047 hectare or 1 hectare equals 2.47 acres.

Table 8.--*Area of noncommercial forest land by local cover type and by topographic site, Upper Yukon unit 6, Alaska* (Thousand acres)[1]

Topographic site	Total	Cover type		
		Spruce	Subalpine	Other
Drained level	66	66	--	0
Drained slope	815	528	--	287
Wet level	2,150	2,143	--	7
Wet slope	12,453	12,365	--	88
Subalpine	2,128	--	2,128	--
Total	17,612	15,102	2,128	382

[1] 1 acre equals 0.4047 hectare or 1 hectare equals 2.47 acres.

Table 9.--*Area of noncommercial forest land by local cover type and by topographic site, Lower Yukon unit 7, Alaska*

(Thousand acres)[1]

Topographic site	Total	Cover type		
		Spruce	Subalpine	Other
Drained level	13	13	--	0
Drained slope	400	200	--	200
Wet level	2,338	2,338	--	0
Wet slope	22,739	22,687	--	52
Subalpine	283	--	283	--
Total	25,773	25,238	283	252

[1] 1 acre equals 0.4047 hectare or 1 hectare equals 2.47 acres.

Table 10.--*Area of noncommercial forest land by local cover type and by topographic site, Kuskokwim unit 8, Alaska*

(Thousand acres)[1]

Topographic site	Total	Cover type		
		Spruce	Subalpine	Other
Drained level	30	6	--	24
Drained slope	543	112	--	431
Wet level	1,245	1,227	--	18
Wet slope	8,869	8,834	--	35
Subalpine	1,381	--	1,381	--
Total	12,068	10,179	1,381	508

[1] 1 acre equals 0.4047 hectare or 1 hectare equals 2.47 acres.

Table 11.--*Area of noncommercial forest land by local cover type and by topographic site, Bristol Bay unit 9, Alaska*

(Thousand acres)[1]

Topographic site	Total	Cover type		
		Spruce	Subalpine	Other
Drained level	167	148	--	19
Drained slope	654	537	--	117
Wet level	741	667	--	74
Wet slope	401	358	--	43
Subalpine	74	--	74	--
Total	2,037	1,710	74	253

[1] 1 acre equals 0.4047 hectare or 1 hectare equals 2.47 acres.

Table 12.--*Area of noncommercial forest land by local cover type and by topographic site, Norton Sound unit 10, Alaska*

(Thousand acres)[1]

Topographic site	Total	Cover type		
		Spruce	Subalpine	Other
Drained level	107	18	--	89
Drained slope	805	586	--	219
Wet level	634	634	--	0
Wet slope	2,712	2,712	--	0
Subalpine	450	--	450	--
Total	4,708	3,950	450	308

[1] 1 acre equals 0.4047 hectare or 1 hectare equals 2.47 acres.

Table 13.--*Percent of total noncommercial forest land by local cover type and survey unit, Alaska*

Survey unit	Total	Cover type		
		Spruce	Subalpine	Other
1	2.7	1.7	0.9	0.1
2	.7	.6	.1	(1/)
3	11.3	10.0	1.0	.3
4	6.6	4.5	2.0	.1
5	4.1	3.2	.8	.1
6	21.1	18.1	2.6	.4
7	30.9	30.3	.3	.3
8	14.5	12.2	1.7	.6
9	2.4	2.0	.1	.3
10	5.7	4.8	.5	.4
Total	100.0	87.4	10.0	2.6

[1] Negligible.

Table 14.--*Percent of total noncommercial forest land*[1] *by topographic site and survey unit, Alaska*

Survey unit	Total noncommercial forest land[2]	Topographic site				
		Drained		Wet		Subalpine
		Level	Slope	Level	Slope	
1	2.7	(3/)	0.3	0.4	1.0	0.9
2	.7	0	.1	.3	.3	.1
3	11.3	.2	.3	2.2	7.6	1.0
4	6.6	(3/)	.1	.8	3.7	2.0
5	4.1	0	.1	1.3	1.9	.8
6	21.1	.1	1.0	2.6	14.9	2.6
7	30.9	(3/)	.5	2.8	27.3	.3
8	14.5	(3/)	.6	1.5	10.6	1.7
9	2.4	.2	.8	.9	.5	.1
10	5.7	.1	.9	.8	3.3	.5
Total	100.0	.6	4.7	13.6	71.1	10.0

[1] Noncommercial forest land totals 83,329,400 acres.

[2] Because of rounding some rows and columns do not balance.

[3] Negligible.

Table 15.--*Area and percent distribution of nonforest land by local cover type and survey unit, Alaska*

Survey unit		Total	Local type							
			Urban-agric.	Dry meadow	Wet meadow	Tall shrub	Dwarf shrub	Barren	Glacier, icefields	Water[1/]
Susitna (1)	M acres	12,198	110	2,547	282	1,880	1,047	2,804	3,366	162
	Percent	10.25	.09	2.14	.24	1.58	.88	2.35	2.83	.14
Kenai (2)	M acres	3,474	10	247	228	608	180	622	1,558	20
	Percent	2.92	.01	.21	.19	.51	.15	.52	1.31	.02
Tanana/Fairbanks (3)	M acres	7,277	12	1,341	255	1,875	1,283	1,532	907	72
	Percent	6.11	.01	1.13	.21	1.57	1.08	1.29	.76	.06
Upper Tanana (4)	M acres	6,887	--	929	51	1,657	1,152	1,261	1,765	72
	Percent	5.79	--	.78	.04	1.40	.97	1.06	1.48	.06
Copper River (5)	M acres	11,993	13	1,422	107	1,213	341	2,205	6,497	195
	Percent	10.08	.01	1.19	.09	1.02	.29	1.86	5.46	.16
Upper Yukon (6)	M acres	14,371	6	4,737	468	2,396	2,741	3,548	25	450
	Percent	12.07	< .01	3.98	.39	2.01	2.30	2.98	.02	.38
Lower Yukon (7)	M acres	14,970	6	3,390	1,771	4,943	2,356	1,808	12	684
	Percent	12.58	< .01	2.85	1.49	4.15	1.98	1.52	.01	.57
Kuskokwim (8)	M acres	11,902	13	2,502	2,791	1,125	2,194	2,163	797	317
	Percent	10.00	< .01	2.10	2.35	.95	1.84	1.82	.67	.26
Bristol Bay (9)	M acres	10,136	6	1,304	5,631	974	347	1,365	144	365
	Percent	8.52	< .01	1.10	4.73	.82	.29	1.15	.12	.31
Norton Sound (10)	M acres	25,802	0	9,617	6,943	2,643	3,267	2,900	0	432
	Percent	21.68	--	8.08	5.84	2.22	2.75	2.43	--	.36
Total	M acres	119,010	176	28,036	18,527	19,314	14,909	20,208	15,071	2,769
	Percent	100.0	.15	23.56	15.57	16.23	12.53	16.98	12.66	2.32

[1/] 1-40 acres.

NOTE: 1 acre equals 0.4047 hectare or 1 hectare equals 2.47 acres.

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